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The Role of Elected and Appointed Village Leaders in the Allocation of Public Resources

Evidence from a Low-Income Region in China

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ABSTRACT

Based on primary survey data collected over two election cycles in a mountainous area in China, where an administrative village consists of several natural villages, this paper examines whether or not elected village heads and appointed Communist party secretaries favor their own natural villages when distributing public resources. The analysis shows clear evidence of favoritism by both village heads and party secretaries. In a subsequent election, incumbent village heads who have shown strong favoritism are likely to lose, but resource distribution does not seem to affect the likelihood of the reappointment of a party secretary.

Keywords: public goods, election, appointed leader, China

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1. INTRODUCTION

Decentralization of authority over the provision, allocation, and delivery of public goods to local governments has been a widespread practice in many developing countries (Bardhan and Mookherjee 2005; Banerjee, Iyer, and Somanathan 2007). The primary argument in favor of such a practice is that local leaders or community representatives have more information about the needs of their people and would choose policies or projects based on their best interests (World Bank 2003). Moreover, in a democratic setting, where local government is subject to electoral pressure, citizens can monitor the local government better than a distant central authority can, thus helping improve the efficiency of the provision of local public goods (Bardhan 2002). Empirical evidence has shown a positive link between local democratization and better provision of public goods in various countries, including India (Besley and Burgess 2002; Foster and Rosenzweig 2001), China (Zhang et al. 2004; Wang and Yao 2007; Luo et al. 2007), and Indonesia (Olken 2010).

Despite these reports of the positive impact of local democracy on the decentralized provision of public goods, strong distributional concerns have arisen with regard to the endemic problem of elite capture in the process of the provision of public goods in many low-income democracies (Bardhan 2002; Khemani 2010). The distributional concerns have been raised on two grounds. First, an election may not necessarily guarantee that capable individuals run for office or that the most qualified candidates can be elected (Besley 2006; Besley, Rao, and Pande 2007). Evidence from socially or ethnically fragmented places shows that voters often align their preferences along the line of identity and vote for candidates mirroring their own identity, regardless of their track record (Alesina, Baqir, and Easterly 1999; Miguel and Gugerty 2005). Second, the elected leaders can use their discretionary power to divert resources to reward a small group of core voters at the expense of many (Keefer 2007; Platteau and Gaspart 2003). These problems are particularly prevalent in young democracies, where politicians have not yet built up their reputations through repeated electoral cycles (Keefer 2007). In India, empirical results from Besley et al. (2004) clearly attest to the relevance of distribution concerns by showing that the elected heads of village councils allocate a larger share of low-spillover public goods to their home villages as rewards for their core constituency.

In this paper, we follow the spirit of Besley et al. (2004) and analyze the allocation of public resources within villages. Since the 1980s, over 900 million Chinese farmers have gained firsthand democratic experience by casting votes to select their village heads. Apart from the elected village head, each village also has an appointed Communist party secretary. With this setting, our study departs from Besley et al. (2004) in several ways. First, we investigate both the role of the elected village head and that of the appointed party secretary in resource allocation and show how the different mechanisms for leader selection can affect policy outcomes. Second, our data covers two electoral cycles, which allows us to study local governance and public resource allocation in a dynamic context by examining re-election results. We can thus provide evidence of voter response to leaders showing different levels of favoritism.

For the purpose of this study, we conducted a survey in Guizhou province, one of the most ethnically diverse and least economically developed areas in China. We obtained information on village governance and the allocation of public goods during two election cycles. Administrative villages (AVs), normally known as "villages," in this area are not naturally formed communities but defined by the state and composed of multiple natural villages (NVs). The survey location is a mountainous area, and natural villages within an administrative village can be located on two different sides of a hill. With such a high degree of ethnic and geographical heterogeneity, the allocation of public resources across natural villages has been a thorny issue.[1]

We demonstrate that the more homogenous the natural villages, the more likely they are to have one of their members elected as the administrative village head but not necessarily to have one appointed as the party secretary. With various specifications that control for the fixed effect of the administrative

[1] To our knowledge, the survey is the first to collect information on public projects at the natural village level in China.

village, we show that village leaders, whether elected or appointed, tend to provide more resources to their home natural villages. We also provide evidence to suggest that electoral competition may limit the favoritism of elected leaders but not that of appointed ones.

Our paper crosses the boundaries of several branches of the literature. First, it relates to the literature on identity politics. Empirical studies based on a recent reservation policy in India show that in villages with newly reserved seats for disadvantaged groups, such as women and scheduled castes, government resources are more likely to be diverted in the direction of these groups' preferences (Besley, Rao, and Pande 2005; Chattopadhyay and Duflo 2004; Pande 2003). In the same setting, however, Ban and Rao (2008) and Gajwani and Zhang (2008) found that, by and large, women leaders in reserved seats do not perform much differently from other leaders.[2] The empirical findings on the impact of identity politics on the allocation of public resources are far from settled. Our paper provides empirical evidence based on grassroots elections in China for this debate.

Second, our paper contributes to an emerging body of empirical literature on village elections and the provision of public goods in China. A growing body of literature shows that village elections result in an increase in the efficiency of the provision of local public goods (Luo et al. 2007; Rozelle et al. 2009; Shen and Yao 2008; Zhang et al. 2004). Some have also argued that solidarity groups in Chinese rural villages, defined by religion or family lineage, may complement electoral selection by acting as monitoring institutions to improve the delivery of public goods and services (Tsai 2002; Xu and Yao 2009), but we still know little about how public resources are distributed within a village.

Third, our paper relates to a small but growing body of literature on how the method of selecting officials could matter in policy outcomes. Researchers have shown that elected officials tend to choose policies more favorable toward voters (Besley and Coate 2003). Appointed officials in certain settings can have better professional credentials and be more efficient (Whalley 2010). Most studies have been focused on developed countries, and our study can provide evidence on this issue from a developing country.

The remainder of the paper is organized as follows: Section 2 provides a brief review of institutional background. Section 3 presents a simple model of public resource allocation within the village. Section 4 includes a discussion of the data and a summary of statistics. Section 5 outlines our empirical approach, Section 6 reports the results, and Section 7 offers some concluding remarks.

[2] The extent to which the leaders' identity matters depends crucially on the characteristics of the community (Besley, Rao, and Pande 2007).

2. INSTITUTIONAL BACKGROUND

The administrative village is not a formal government body in China; instead its legal status is that of a "self-governing" agency. The 650,000 administrative villages nationwide are therefore regarded as the most important "community organizations" in rural China (World Bank 2007); however, leaders of administrative villages are in practice agents of the state, entitled to salaries, albeit at a rather low level, and obligated to implement government policies and carry out central mandates (Rozelle and Boisvert 1994). In that sense, they are effectively "officials." As both "community leaders" and "grassroots officials," administrative village leaders play an important role in the provision and allocation of public goods in rural China.

Provision and Allocation of Public Goods in Administrative Villages

China's fiscal system is highly decentralized, and many public goods are financed and provided by local governments (Wong 2002), which at the county and township levels bear major responsibilities for providing some key public goods, such as schools. In general, funding comes primarily from local revenues, supplemented by transfers from higher-level governments; however, intergovernmental transfer is more important in poor regions. In the 1980s and 1990s, administrative villages relied heavily on fees collected from farmers, in-kind labor contribution, or revenues from village enterprises to finance small-scale infrastructure projects at the village level (World Bank 2007). After China abolished agricultural taxation in the early 2000s,[3] villages lost the discretionary power of taxing farmers, consequently relying increasingly on fiscal transfers from the upper-level government and villagers' in-kind contributions to support local public projects (Zhang et al. 2006).

In our sampled villages, which locate in a low-income minority region (more on the sample in Section 4), most funding for infrastructure projects, such as roads, bridges, running water, and electricity, comes from upper level governments, particularly the county government. The funding from the county government originates from various programs under the county agencies, such as the poverty alleviation office, agriculture bureau, forest bureau, irrigation bureau, and development and planning commissions. Villages sometimes also provide matching funds and contributions of labor in-kind.

The reliance of administrative villages on governmental transfers for the provision of major public goods does not mean that village leaders merely passively implement upper-level government mandates and development plans. Instead they are actively involved in every stage of public investment. First, village leaders are responsible for raising funds for public projects and implementing earmarked projects. For this purpose they routinely travel to county seats or township governments to apply for funds or lobby for additional public investments for their villages.[4] Second, they manage available funds to deliver public projects and carry out central mandates. The findings in the literature that villagers' election increases public investments or discourages rentseeking attest to the discretionary power of village leaders. Third, village leaders directly influence how the public resources are allocated across natural villages within an administrative village. No obvious mechanism is in place to ensure the interest of every natural village in the process of public resource allocation. Consequently, in administrative villages with high heterogeneity in ethnicity and family lineages, villagers are often concerned about fairness in the allocation of public resources across natural villages.

[3] For reviews of rural fiscal reforms, see Luo and others (2007), World Bank (2007), and Yep (2004).

[4] Other things being equal, informal networks or social connections are likely to affect how many and what investment projects village leaders can obtain from upper government. Zhang et al. (2006) document a positive correlation between the number of people originally from the village holding positions later as officials in the township or upper-level governments and the number or level of investment projects back in the village.

Governance Structure of Administrative Villages

The current organizational structure of administrative villages consists of the villagers' assembly and two committees: the party committee, with the party secretary as its chief, and the villagers' committee, chaired by the village head. The villagers' assembly, composed of all villagers aged 18 and above, is in principle the highest decisionmaking agency, with the power of overseeing the villagers' committee. However, its real power is questionable, given its infrequent meetings and its tendency to be controlled by the village cadres (Oi and Rozelle 2000). Most daily decisions regarding village affairs are made in the villagers' committee meetings. In administrative villages with multiple natural villages, the villagers' committee normally has representatives from different natural villages. The party committee is in charge of enlisting new Communist party members, maintaining the operation of party activities at the grassroots level, and assisting the villagers' committee in carrying out central mandates, such as enforcing family planning and resolving social conflict.

The selection procedures of the chairs of the two committees—the party secretary and the village leader—are different. Party secretaries are either appointed by the upper-level party officials or elected by village party members, but they are not directly elected by villagers' votes.[5] Village heads are directly elected by villagers[6] even though large variations exist across provinces on procedural rules governing village elections with regard to nominations, candidate selection, campaigning, absentee ballots, and voting booths (Tan 2004). However, all villages within a county usually follow the same electoral procedures and timing.

The locus of decisionmaking power in administrative villages is shared by the two leaders, but because of no clear stipulation with regard to the division of power, how the "dual administrative teams" compete and cooperate is likely to vary across villages. In our survey 76 percent of the villages reported that the village heads were the decisionmakers on important issues. This is consistent with the view that elected village heads would enjoy stronger legitimacy than party secretaries and thus play a dominant role in the administration. In some more developed places, however, party secretaries seem to have greater control over village affairs (Zhang et al. 2004). As pointed out by Oi and Rozelle (2000), the real power of villages in the 1980s and 1990s was determined by control over income-generating enterprises, not by election; the final say in more recent years is likely to rest with the leader with greater entrepreneurial ability and better social connections.

[5] A large regional variation exists in the procedure for selecting a party secretary. In some places, the party secretary is directly appointed by the upper-level government, but in other places, the party secretary is first elected by party members within a village and then approved by the government. In yet others, party secretaries are popularly elected by party members (Oi and Rozelle 2000). Some counties also established an "experimental double-ballot system," in which voters would cast a vote for the election of the village head and then one for the party secretary as a "public opinion poll." If the party secretary did not receive at least 50 percent of the popular vote, she or he was "disqualified from standing as a candidate for village party secretary" (Shi 1999). All villages within a county usually follow the same protocols.

[6] The selection procedure of village heads has undergone stages of reform, which officially started with the 1987 provisional Organic Law of Villager Committees, mandating that all villages conduct elections to choose village committee members. The provisional law took effect in 1988 and was implemented in a decentralized and experimental way, in which each province was allowed to promulgate its own procedure and timing of the village election. The election experiments scaled up to more provinces until 1998, when the Organic Law was further amended and formally took effect.

3. A SIMPLE MODEL OF PUBLIC RESOURCE ALLOCATION WITHIN VILLAGES

Following Besley and others (2004), we consider an administrative village (AV) that has two natural villages (NVs) indexed $j \in \{1, 2\}$. The share of population in the first NV is s. Assume a public good $g_j \in [0, G]$ is provided to each natural village. For simplicity, assume the administrative village leader (either elected village head or appointed party secretary) is from natural village 1. The utility for the representative in natural village 1 (in this case village leader, either village head or party secretary) is

$$V_1(g_1, g_2) = \alpha_1 \log(g_1) + \beta \log(g_2) + y_1. \quad (1)$$

On a given amount of allocated public resources g_1, a representative's utility depends upon the heterogeneity of his home natural village. The same amount of public resources, allocated to a more homogenous community, brings about more utility to the village leader than if it were allocated within a fragmented community, which may create more tensions among different groups. α_1 measures the impact of heterogeneity on the village head's utility for a given amount of public resources allocated to his home village.

A village leader may also care about the welfare of the other natural village because he needs to seek its votes. $\beta \geq 0$ measures the extent of a village leader's concern about the second natural village. It is a function of s, the share of home village population. If an elected village leader cares about re-election, he will take the number of votes from the second village into account. y_1 captures private goods.

The utility for the representative in natural village 2 is

$$V_2(g_2) = \alpha_2 \log(g_2) + y_2. \quad (2)$$

Because the representative is not a village leader, he does not need to worry about re-election; therefore, we assume his or her utility draws solely from allocated resources g_2 and private goods y_2. We normalize the price of public good provision to one. Thus, the budget constraint for total village public resources can be written as

$$g_1 + g_2 = T. \quad (3)$$

The allocation of public resources is determined by representatives from each natural village. We assume that the village representatives make decisions by maximizing a weighted sum of the utility of the two representatives,

$$\mu V_1(g_1, g_2) + (1 - \mu) V_2(g_2), \quad (4)$$

subject to budget constraints (3).

We assume that the weight μ for the utility of the village leader is larger than that of a non-leader, therefore $\mu > 1/2$.

The solution to the budget constrained maximization problem in (4) is

$$g_1 = \frac{\alpha_1 \mu T}{\alpha_1 \mu + \beta \mu + \alpha_2 - \alpha_2 \mu}. \quad (5)$$

The following empirically testable predictions can be derived from equation (5):

> **Claim 1:** After controlling for the home village population share, relative to the natural village that is not the home village of a leader (either the village head or the party secretary), resource allocation is higher in the leader's natural village.

Claim 2: The more heterogeneity in the village head's home natural village, the fewer resources it receives.

Claim 3: As the village leader's concern for the welfare of the entire administrative village grows, the home village advantage will diminish.

Considering that an appointed party secretary is not subject to voters' pressures, he or she may not be influenced by his home village as much as the elected village head. Moreover, one major responsibility of the party secretary is to maintain social stability; thus, he or she may care more about the equity among villagers than does the elected village head. With a higher β, she or he would bring fewer resources to the home natural village than the elected village head; however, because we did not observe the weight μ for village heads, party secretaries, and β, it is an empirical question to test whether the elected and appointed leaders favor their home villages in resource allocations.

4. DATA AND DESCRIPTIVE STATISTICS

The data used in this paper comes from a survey on Public Policy and Rural Poverty (PPRP) in Puding County of Guizhou Province, conducted by the Chinese Academy of Agricultural Science, International Food Policy Research Institute, and Guizhou University in 2005. Guizhou Province is among the early groups of provinces that piloted the implementation of the provisional Organic Law.[7]

Puding County provides a unique setting to study the allocation of public goods within villages because of its heterogeneity in several dimensions. First of all, the county is ethnically diverse.[8] It has more than 20 ethnic groups, and ethnic minorities (or non-Han) account for about 20 percent of the total population.[9] Second, the county is located in a mountainous area and is geographically diverse. Most administrative villages include multiple natural villages often separated by natural divides, such as hills. Natural villages in the valley differ from those on the hill with regard to the demand for public goods. It is not uncommon for a natural village to have ethnic compositions and languages different from those of its neighboring natural villages even though they belong to the same administrative village.

For purposes of the survey, townships within Puding County were stratified by income (low, middle, and high), and a weighted sampling scheme was used to select four random townships (one in a low-income, two in middle-income, and one in a high-income township). All administrative villages in two of the four townships were surveyed, with 16 in one and 17 in the other. For the other two townships, which are much larger in area, 15 administrative villages were randomly selected in one and 20 in the other. By this design, the administrative villages in small townships, which are at the low- to middle-income level in the county, are oversampled. In the chosen 68 administrative villages, all 286 natural villages were surveyed to assure that we could identify the patterns and determining factors in the allocation of public goods within an administrative village.[10]

The administrative village survey yielded information on basic characteristics of the village, such as population size, geographic areas, ethnic composition, typology, and the number of natural villages. It also provided information on village election history, characteristics of village leaders (village heads and party secretaries) in the most recent three terms, village budgets, incidence of natural disasters, and the amounts and types of public investments since 1993. Aside from information about basic characteristics, similar to that in the administrative village survey, the natural village survey yielded detailed data on public projects received since 1993, including amounts, types, and beginning and ending dates of implementation. Twenty types of public goods were identified in these data.[11]

We collected complete information on the two most recent election terms with regard to leaders' characteristics and the timing of elections,[12] which differed in the 64 administrative villages. Ten of the 64 held elections in 1998 and 2001, so the two official terms spanned 1998–2001 and 2001–2004; terms in the rest spanned 1999–2002 and 2002–2005.[13]

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[7] On July 26, 1989, the People's Congress of Guizhou Province passed implementation methods of the provisional Organic Law, the fourth province to do so, after Fujian, Zhejiang, and Gansu provinces.

[8] Puding County is one of 592 counties designated as poor by the central government. It has 11 townships, 317 administrative villages, and a total population of 402,000. About 94 percent of the total population resided in rural areas at the time of our survey, and agricultural labor amounted to 63 percent of total labor.

[9] The dominant ethnic minority groups are Miao, Buyi, Gelao, and Yi.

[10] In the analysis we dropped observations with incomplete information, so the final sample contains 64 administrative villages and 274 natural villages.

[11] These 20 types of public projects are roads, bridges, water storage, wells, tap water supplies, irrigation, drainage, electricity, TV reception, biogas supplies, solar utilities, land improvements, dams, slope land buildings, forestry buildings, public forestry, land-to-forestry conversion, grassland maintenance, buildings for farm animals, and others.

[12] The data on the third most recent term contain more missing values; therefore, we focus on the two most recent terms so that we do not have to reduce the sample size significantly. Also we are more comfortable with the recall information on public projects for the more recent years.

[13] The official self-governance document (CRLSRT 2000) stipulated that villages in Guizhou Province were supposed to have elections in early 1999, 2002, and 2005, right before or after the Chinese new year, which is always later than the new year in the standard calendar, sometimes by up to two months. The difference in the reported election timing may reflect some

Table 1 summarizes the characteristics of village leaders, including both elected heads of village committees and appointed party secretaries, broken out by term of office. Individual characteristics changed little across the two terms. Several features are apparent from the table. First, family lineage correlates with the likelihood of an individual's serving as a village leader. Close to 40 percent of village heads and party secretaries are from big family lineages. Second, on average, party secretaries enjoy longer tenure than village heads. Third, party secretaries are more likely to be veterans than are village heads, who are more likely to have experienced migration. This is not surprising, given that joining the army is a major pathway for a rural resident to become a Community party member. In comparison, the migration experience in more developed provinces presents a candidate with some credentials to lead a village.

Table 1. Characteristics of village leaders

	1st term		2nd term	
	Village head	Party secretary	Village head	Party secretary
Belonging to the largest family clan in the administrative village	0.27	0.28	0.27	0.25
Belonging to the second largest family clan in the administrative village	0.14	0.19	0.16	0.16
Terms in the position	2.00	2.82	2.10	2.84
Status as a veteran	0.08	0.23	0.10	0.25
Status as a returning migrant	0.19	0.09	0.19	0.10
Age	49.56	52.26	49.08	50.15
Education				
___primary school or lower	0.23	0.33	0.14	0.19
___junior high school	0.69	0.43	0.69	0.56
___senior high school or higher	0.08	0.24	0.17	0.25
Gender	0.94	0.89	0.95	0.92
Elected				
___by villagers	0.89		0.90	
___by villagers' committee	0.11		0.10	
Number of villages	64			

Source: PPRP Survey Data (2005).
Notes: Ten of the 64 villages held elections in 1998 and 2001, so the two official terms in these villages spanned 1998–2001 and 2001–2004; terms in the other villages spanned 1999–2002 and 2002–2005.

The heterogeneities among administrative villages and among natural villages within a single administrative village are substantial (Table 2). On average, administrative villages comprise about 7 natural villages, and the average distance between the two furthest natural villages is about 2.1 kilometers; but the distance could be as far as 15 kilometers. Administrative villages on average have 361 households and natural villages have 56. They are very diverse with respect to family lineage, ethnicity, typology, and size. The diversity of family lineage is measured by a Herfindahl index of family name composition.[14] A Herfindahl index of 1 means that all households in the village shared the same family

respondents' use of the lunar calendar in their reporting.

[14] The Herfindahl index is calculated as the sum of squared shares: $H = \sum_{i=1}^{N} s_i^2$. The Herfindahl index of family name composition is the summation of the squared shares of the population with a family name that is, respectively, the most common

name. A small Herfindahl index implies the existence of many small family clans; hence the village is fragmented along this dimension. The average Herfindahl index of family lineage is 0.37. In terms of ethnic diversity, the average Herfindahl index of ethnic composition is less than 0.8, and the typology Herfindahl index is 0.5. The relatively large standard deviations in these measures suggest that some of the administrative villages are more heterogeneous than others. Although natural villages vary by population size and geographic area, they are more homogenous than administrative villages, as is evident by smaller Herfindahl indexes. The initial conditions were such that in 1999 about 17 percent of the natural villages had a paved road passing through them, and about 17 percent of the working-age population had migrated.

Table 2. Heterogeneities of administrative villages and natural villages

	Mean	S.d.	Min	Max
Characteristics of administrative villages				
Number of natural villages	7.09	3.06	2	14
Number of registered households	361.23	187.99	101	936
Total area (mou)	5992.68	7398.05	600	54000
Distance between two furthest natural villages (km)	2.18	2.13	0	15
Herfindahl index of family name composition	0.38	0.19	0.117	0.845
Herfindahl index of ethnicity composition	0.78	0.20	0.37	1
Herfindahl index of typology composition	0.49	0.22	0.188	1
Number of obs.		64		
Characteristics of natural villages				
Total population	254.01	141.89	37	829
Total area (mou)	343.15	1120.98	38	11000
Distance to center of the administrative village (km)	0.87	0.91	0	5
Herfindahl index of family name composition	0.44	0.22	0.103	1
Herfindahl index of ethnicity composition	0.89	0.17	0.13	1
Herfindahl index of typology composition	0.67	0.26	0.113	1
Whether the natural village had a road passing through in 1999	0.17	0.38	0	1
Percentage of natural village population who migrated for work in 1999	17.01	13.88	0	90
Number of obs.		274		

Source: PPRP Survey Data (2005).

In Table 3, we report the number of public goods received by the natural villages during the two election terms, stratified by whether a natural village had a village leaders, including a village head, a party secretary, or both. The last three columns report t-tests with p-values in parentheses for testing the difference between public goods received by leaders' natural villages and those by nonleader natural villages. Compared to the nonleader natural villages, the home natural village of a head is more likely to receive infrastructure projects, such as roads and electricity, and environmentally oriented programs, such as Grain for Green and protection of the forest. Home natural villages of the secretary also receive more

in the village, the second most common, the third most common, and all others. The ethnicity Herfindahl index is the summation of the squared shares of population who are Han, Miao, Buyi, and all other ethnic groups. Similarly, the typology Herfindahl index is the sum of the squared share of the mountain, cropland, grassland, water area, and forestland as the total area of the natural village.

Grain for Green programs. Evidence also shows that the total number of projects or the total value of projects received by leaders' home natural villages are greater than those in the nonleader natural villages.

Table 3. Distribution of public goods within administrative villages, 1998–2005

	No village leader (1)	Village head (2)	Party secretary (3)	Village head & party secretary (4)	(2)-(1)	(3)-(1)	(4)-(1)
			Term 1				
Road	0.11	0.25	0.19	0.31	**2.04**	1.22	**1.64**
	(0.32)	(0.44)	(0.39)	(0.48)	**(0.02)**	(0.11)	**(0.06)**
Running water	0.11	0.10	0.17	0.13	-0.03	1.03	0.22
	(0.31)	(0.31)	(0.38)	(0.34)	(0.51)	(0.15)	(0.41)
Grain for Green	0.12	0.15	0.23	0.06	0.48	**1.67**	-0.82
	(0.32)	(0.36)	(0.42)	(0.25)	(0.31)	**(0.05)**	(0.79)
Electricity	0.45	0.56	0.46	0.50	**1.40**	0.13	0.39
	(0.50)	(0.50)	(0.50)	(0.52)	**(0.08)**	(0.45)	(0.35)
Program on protecting	0.07	0.10	0.10	0.19	0.60	0.60	1.10
natural forests	(0.26)	(0.31)	(0.31)	(0.40)	(0.27)	(0.27)	(0.14)
Others	0.28	0.29	0.31	0.25	0.16	0.43	-0.25
	(0.45)	(0.46)	(0.47)	(0.45)	(0.44)	(0.33)	(0.60)
Total number of							
projects	0.68	0.77	0.83	0.75	1.23	**2.29**	0.57
	(0.47)	(0.42)	(0.38)	(0.45)	(0.11)	**(0.01)**	(0.29)
Monetary value of the	125.94	150.58	161.31	277.67	0.59	0.67	**1.40**
projects (per capita)	(321.57)	(227.28)	(320.17)	(421.61)	(0.28)	(0.25)	**(0.09)**
Number of villages	161	48	48	16			
			Term 2				
Road	0.25	0.25	0.25	0.32	-0.04	-0.04	0.55
	(0.44)	(0.44)	(0.44)	(0.48)	(0.52)	(0.52)	(0.29)
Running water	0.10	0.16	0.07	0.16	0.94	-0.76	0.62
	(0.30)	(0.37)	(0.25)	(0.37)	(0.18)	(0.77)	(0.27)
Grain for Green	0.22	0.36	0.34	0.26	**1.76**	**1.49**	0.37
	(0.42)	(0.49)	(0.48)	(0.45)	**(0.04)**	**(0.07)**	(0.36)
Electricity	0.20	0.20	0.11	0.16	0.08	-1.48	-0.45
	(0.40)	(0.41)	(0.32)	(0.37)	(0.47)	(0.93)	(0.67)
Program on protecting	0.15	0.18	0.20	0.21	0.48	0.80	0.60
natural forests	(0.36)	(0.39)	(0.41)	(0.42)	(0.32)	(0.21)	(0.28)
Others	0.34	0.41	0.36	0.53	0.86	0.32	1.53
	(0.47)	(0.50)	(0.49)	(0.51)	(0.20)	(0.37)	(0.07)
Total number of							
projects	0.69	0.84	0.73	0.79	**2.23**	0.45	0.94
	(0.46)	(0.37)	(0.45)	(0.42)	**(0.01)**	(0.33)	(0.18)
Monetary value of the	131.94	244.05	336.94	215.18	**1.53**	**1.33**	0.87
projects (per capita)	(360.32)	(448.31)	(1008.82)	(398.63)	**(0.07)**	**(0.10)**	(0.20)
Number of villages	166	44	44	20			

Source: PPRP Survey Data (2005).

Notes: Standard deviations are in parentheses for the first four columns. The last three columns report t-statistics with p-value in parentheses. Bold numbers stand for significance level at 10%.

5. EMPIRICAL FRAMEWORK

First of all, we want to examine how the characteristics of an NV correlate with its political power, measured by the probability that the NV has a member elected to the position of village head or appointed as party secretary. For this purpose we run a set of probit regressions where the outcome variable is whether the village head is from the natural village, and a separate set to examine whether the party secretary is from the natural village.

The leader (either village head or party secretary) of AV j from NV i is denoted by L_{ij}. In a linear form, it is a function of the characteristics of a natural village V_{ij} and the fixed effect of an administrative village v_j:

$$L_{ij} = \alpha_0 + V_{ij}'\alpha_1 + v_j + \varepsilon_{ij}. \tag{6}$$

We examine this relationship for the latest round of elections, which happened in late 2004 or early 2005, right before the survey was administered. We expect larger natural villages to have greater voting power. In a democratic election setting, we also expect that the more heterogeneous a natural village is, the less likely the NV is to form consensus and back up a single candidate. So we include the population size of the natural village and a set of heterogeneity indexes in the vector of village characteristics. Land typology, population diversity, and distance to the administrative village center are additional control variables at the natural village level. The initial infrastructure and labor market conditions may also affect the social and economic development of the natural village, which in turn may influence the public projects it received. Therefore, we also include two variables describing initial conditions in 1999: whether the village had a passable road and the percentage of migratory labor. If the agriculture production of the natural village is affected by natural disasters (caused by severe weather), it is likely that it would attract relief and rebuilding projects. So we include a binary variable indicating whether the natural village experienced a natural disaster during the period from 1999 to 2004. We also include administrative village fixed effects (v_j) so that the comparison of political power across natural villages is carried out within one administrative village.

Second, we examine whether the public goods projects (the number of projects or the amount of investments) received by each natural village i in term t are associated with whether the natural village has a leader during term t:

$$P_{ijt} = \beta_0 + \beta_1 L_{ijt} + V_{ij}'\beta_2 + D_1 + v_j + \epsilon_{ijt} \qquad (t = 1, 2) \tag{7}$$

Based on the retrospective information, we are able to construct data on the allocation of public projects during two terms of village leadership and match them with initial conditions and incidence of natural disasters in the NVs. To account for potential difference in macroeconomic conditions between the two leadership terms, we include in the regression a dummy variable, indicating whether a public project occurs during the first term.

To take advantage of the information for two terms, we also estimate a first-differencing version of equation (7), again controlling for natural village characteristics that change little over time:

$$\Delta P_{ij} = \tau_0 + \tau_1 \Delta L_{ij} + V_{ij}'\tau_2 + v_j + \Delta\epsilon_{ij} \tag{8}$$

In this specification we effectively control for NV fixed effects, and also allow AV fixed effects (v_j) to affect the change of public resource allocations. If village leaders favor their own natural village in resource allocation, then we expect the coefficient of the leader variable τ_1 to be positive, as evidence of favoritism.

Finally, we examine whether the allocation of public goods during the previous term would affect the likelihood of re-election for the village head or reappointment for the party secretary. As an elected

official, the head is supposed to be accountable to the villagers. So if the head favors his or her own natural village, the chance of re-election would be either bigger or smaller, depending on the degree of favoritism and relative population size of the head's own natural village and other villages. Party secretaries, however, face a different form of accountability. A secretary is more accountable to the higher-level government but less to other villagers; therefore, the degree of favoritism might not matter much in the question of reappointment. The specification follows:

$$R_{ij2} = \gamma_0 + \gamma_1 P_{ij1} + I'_{ij}\gamma_2 + V'_{ij}\gamma_3 + \omega_{ij2}. \quad (9)$$

The left-hand variable is defined as 1 if a leader is re-elected or reappointed and 0 otherwise. In this regression we control for individual characteristics of the leader I_{ij}. γ_1 is expected to be significant for the estimation of the village head but not for that of the party secretary.

6. RESULTS

Corresponding to the three questions outlined in the previous section, our empirical results are presented in three parts. First, we analyze the correlation between the characteristics of NVs and their political power. Second, we examine political power as a determinant of the allocation of public goods across NVs within an AV. Finally, we ask whether the allocation of public goods affects the leader selection in the subsequent election of village heads or appointment of party secretaries.

Characteristics of the NV and Its Political Power

Table 4 presents marginal effects from the estimations of a probit model on the probability that an NV has a member elected as the village head or appointed as its party secretary for the most recent term. Regression results for the village head are reported in the first four columns, followed by estimates for the party secretary.

Conditional on AV fixed effects, these estimations show that NV characteristics affect village head elections and party secretary appointments differently. With regard to the election of a village head, the results show that large NVs are more likely to have a member elected as the village head. More specifically, a 10 percent increase in the population of an NV increases its likelihood of having a member in the position of village head by 1.8 percentage points (column 1). We further add three Herfindahl measures to control for the heterogeneity of an NV along the geographic, ethnic, and family clan dimensions (column 2). Geographic heterogeneity does not seem to matter, but both ethnic diversification and family clan composition are significant determinants of the NV's political power—village heads are more likely to come from NVs with more homogenous ethnic groups and family clans. These results are robust to adding in two more control variables, which measure the NV's total geographic area and whether it is home to the AV governance center (column 3). With the extra controls for population characteristics, the coefficient on population size becomes smaller and turns insignificant.

In the last set of regressions (column 4), we further control for initial conditions in the NVs in 1999, including whether a road passed through and what percentage of the population migrated for work. Migrant share may capture the average level of education in the population, and it may also capture social and economic connections with places outside the village. In addition, we include a binary variable to capture any incidence of natural disaster during the period 1999–2004. The results confirm the previous conclusion that population size positively correlates with the political power of the NV, and so do the homogeneous levels of the NV in its ethnicity and family clan composition. Moreover, we find that the share of migrants in the population of an NV in 1999 positively relates to the probability that the village head was from this NV.[15]

The results for party secretaries reveal very different patterns. None of the population characteristics found significant for the selection of a village head are important determinants for the appointment of a party secretary. In particular, the size and heterogeneity of the population of an NV cannot predict whether a party secretary is from the NV; neither can the migration share in 1999. But this is not to say that NV characteristics do not matter at all for party secretary appointments. In fact, the results with the full set of controls (column 8) show that both geographic area and location of an NV may influence whether one of its residents can be appointed as party secretary, since secretaries are more likely to come from geographically large NVs or from NVs located in the governance center of the AV.

[15] Ideally, we want to control for candidate quality (or quality of "potential candidates" in the case of party secretaries). Unfortunately, we do not have such information. So we might have overestimated the importance of some of the characteristics of the NV, such as the migration share, which may positively correlate with candidate quality.

Table 4. Correlations of natural village characteristics and the election or appointment of a village leader

	Village head from the NV				Party secretary from the NV			
Total population (log)	0.180**	0.168**	0.12	0.139*	0.049	0.046	-0.032	-0.041
	(0.078)	(0.082)	(0.081)	(0.083)	(0.077)	(0.078)	(0.075)	(0.076)
Herfindahl index of family name composition		0.256*	0.241*	0.254*		0.073	0.024	0.021
		(0.139)	(0.138)	(0.137)		(0.116)	(0.117)	(0.116)
Herfindahl index of typology composition		0.000	0.002	0.043		-0.089	-0.071	-0.075
		(0.164)	(0.161)	(0.177)		(0.183)	(0.173)	(0.173)
Herfindahl index of ethnicity composition		0.290**	0.350**	0.324**		0.089	0.174	0.184
		(0.145)	(0.148)	(0.149)		(0.141)	(0.150)	(0.149)
Total area (log)			0.06	0.053			0.101**	0.106**
			(0.045)	(0.045)			(0.042)	(0.042)
Administrative village center			0.182*	0.169			0.258**	0.272***
			(0.099)	(0.103)			(0.102)	(0.104)
Had a road passing through in 1999				0.027				-0.029
				(0.106)				(0.093)
Percentage of population migrated for work in 1999				0.005**				-0.002
				(0.002)				(0.003)
Had a natural disaster between 1999 and 2004				0.057				0.044
				(0.071)				(0.078)
Administrative village fixed effects	included	included	included	included	included	included	included	included
Number of observations	274	274	274	274	274	274	274	274
Log likelihood	-141.736	-142.429	-140.71	-138.343	-134.317	-135.667	-133.692	-133.163

Source: PPRP Survey Data (2005).

Notes: Coefficients reported are marginal probabilities from probit estimations. Robust standard errors, corrected for serial correlation within an administrative village and arbitrary heteroskedasticity, are in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village.

Political Power of the NV and Its Public Goods

To examine resource allocation across NVs within an AV, we first define the outcome variable as the number of public projects that an NV received during each of the terms following two recent elections. The ordinary least squares (OLS) results with AV fixed effects appear in Table 5. The first specification (column 1), with two control variables measuring the political power of an NV (whether the village head is from the NV and whether the party secretary is from the NV), provides the baseline results and shows that the home NV of the village head or the party secretary receives more projects. Being the "leader" NV brings about 0.2 more projects. In the next specification (column 2), we add an interaction term of the two variables and find that being the home NV of two leaders does not bring in more projects than being the home NV of one leader. These results hold after adding conditional control on whether any other member of the villagers' committee is from the NV (column 3). The coefficient on the other committee member is small in magnitude and not statistically significant, implying little influence of committee members other than the head and the secretary in the allocation of public goods.

Table 5. Number of projects received by natural villages and their political power

	(1)	(2)	(3)	(4)	(5)
Village head from the NV ($\widehat{\alpha_1}$)	0.283***	0.267**	0.317**	0.285*	0.277*
	(0.108)	(0.130)	(0.148)	(0.154)	(0.149)
Party secretary from the NV ($\widehat{\alpha_2}$)	0.218**	0.202*	0.252*	0.253*	0.232*
	(0.099)	(0.111)	(0.133)	(0.136)	(0.134)
Village head from the NV× party secretary from the NV ($\widehat{\alpha_3}$)		0.062	0.022	-0.001	0.032
		(0.389)	(0.393)	(0.389)	(0.387)
Other member of the villagers' committee from the NV			0.132	0.140	0.138
			(0.157)	(0.159)	(0.160)
Population				0.167	0.088
				(0.122)	(0.112)
Area				0.058	0.081
				(0.078)	(0.081)
Term 1				-0.117	-0.069
				(0.198)	(0.202)
Herfindahl index of family name composition				-0.143	-0.230
				(0.189)	(0.183)
Herfindahl index of typology composition				0.308	0.283
				(0.316)	(0.327)
Herfindahl index of ethnicity composition				0.160	0.152
				(0.206)	(0.206)
Administrative village center					0.168
					(0.126)
Had a road passing through in 1999					-0.187
					(0.161)
Percentage of population migrated for work in 1999					-0.005
					(0.003)
Had a natural disaster between 1999 and 2004					0.220*
					(0.129)
Administrative village fixed effects	included	included	included	included	included
f-statistics for testing $\widehat{\alpha_1} = \widehat{\alpha_2}$	0.21	0.21	0.21	0.05	0.09
p-value	0.647	0.647	0.649	0.828	0.763
f-statistics for testing $\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\alpha_3}$=0		3.50	3.89	3.20	3.26
p-value		0.066	0.053	0.079	0.076
Number of observations	548	548	548	548	548

Source: PPRP Survey Data (2005).
Note: Robust *t* statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; significant at 10%; ** significant at 5%; *** significant at 1%.

Next we check to determine whether the above-noted leader effects are robust to inclusions of NV characteristics that correlate with the probability of an NV's being the home of a cadre (column 4). The additional variables include population and geographic size, a dummy variable for the earlier term (1998–2001 or 1999–2002), and Herfindahl indexes. Conditional on these additional variables, the coefficients on head's home NV and secretary's home NV remain positive and significant. Results in the last specification (column 5) provide further checks on the robustness of the results by including variables measuring NV initial condition and occurrence of natural disasters. The coefficients of being the home NV of the head or of the secretary are still significant, albeit at a smaller magnitude. Conditional on political power, other NV characteristics are not important factors in determining the allocation of public goods. One exception is the incidence of natural disasters—NVs where natural disasters had occurred receive more public goods, independent of their political power. This result is consistent with the social assistance nature of some of the projects.[16]

In summary, these regression results suggest that the leader NVs receive more public goods than the nonleader NVs because of their larger agenda-setting power. The finding is consistent with our Claim (1); however, we do not find that the party secretary behaves much differently from the elected village head, in contrast to what we expect in Claim (2). Party secretaries also exercise favoritism toward their home villages.

The number of public projects received by each NV may be a crude measure of resource allocation. To further check the robustness of the above results, we use the logarithm of the project value (per capita) received by NVs as the dependent variable. Table 6 reports OLS results with the same specifications as in Table 5. Once again, we find that the home NV of the head receives more public goods in terms of monetary value, and so does the home NV of the party secretary. These leader effects hold when more control variables are included in the regressions. The results with the full set of controls show that, compared with nonleader NVs, the head's home NV receives 100 percent more investment and the secretary's home NV receives about 60 percent more. These two effects are not statistically different from each other.

Results with two different measures of public goods provide consistent evidence that leaders' home NVs receive more resources; however, we are still concerned that NV fixed characteristics that are unobservable to us, such as land quality, typology, historical events, social norms, and culture, may affect its member's selection as a village leader and may also affect how many public goods it receives. To address this concern, we take advantage of having data for two election terms and examine the impact of change in political power of NVs on changes in resources received.

[16] In the survey project list, such projects are likely to be included in the category of "others."

Table 6. Monetary value of public goods received by natural villages and their political power

	(1)	(2)	(3)	(4)	(5)
Village head from the NV ($\widehat{\alpha_1}$)	0.819***	0.915***	1.020***	1.049***	1.021***
	(0.228)	(0.273)	(0.286)	(0.303)	(0.293)
Party secretary from the NV ($\widehat{\alpha_2}$)	0.368	0.465	0.571*	0.612*	0.563*
	(0.254)	(0.326)	(0.327)	(0.325)	(0.319)
Village head from the NV× party secretary from the NV ($\widehat{\alpha_3}$)		-0.362	-0.445	-0.481	-0.424
		(0.701)	(0.700)	(0.717)	(0.715)
Other member of the villagers' committee from the NV			0.276	0.320	0.322
			(0.286)	(0.290)	(0.293)
Population				-0.102	-0.257
				(0.388)	(0.385)
Area				-0.161	-0.113
				(0.164)	(0.160)
Term 1				-0.272	-0.157
				(0.282)	(0.290)
Herfindahl index of family name composition				-0.214	-0.397
				(0.447)	(0.431)
Herfindahl index of typology composition				0.294	0.299
				(0.800)	(0.847)
Herfindahl index of ethnicity composition				0.100	0.071
				(0.440)	(0.435)
Administrative village center					0.372
					(0.246)
Had a road passing through in 1999					-0.335
					(0.365)
Percentage of population migrated for work in 1999					-0.006
					(0.007)
Had a natural disaster between 1999 and 2004					0.539*
					(0.278)
Administrative village fixed effects	included	included	included	included	included
f-statistics for testing $\widehat{\alpha_1} = \widehat{\alpha_2}$	1.76	1.75	1.74	1.55	1.87
p-value	0.189	0.191	0.192	0.217	0.176
f-statistics for testing $\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\alpha_3}$=0		4.47	5.33	5.48	4.94
p-value		0.038	0.024	0.022	0.030
Number of observations	548	548	548	548	548

Source: PPRP Survey Data (2005).
Note: Robust *t* statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village.

The estimations for changes in the number of projects are reported in Table 7. Consistent with previous findings, the head home NVs receive significantly more investment in public goods. The coefficient on the party secretary home NV is positive but insignificant; however, we cannot reject the null hypothesis that the two leader effects are statistically the same at the conventional significance level. After we add in more variables of NV characteristics and initial conditions, the results are robust.

Table 7. Changes in the number of projects received by natural villages and changes in their political power

	(1)	(2)	(3)	(4)	(5)
Δ Village head from the NV ($\widehat{\alpha_1}$)	0.517**	0.440**	0.472**	0.452**	0.535**
	(0.212)	(0.216)	(0.230)	(0.215)	(0.217)
Δ Party secretary from the NV ($\widehat{\alpha_2}$)	0.093	0.149	0.188	0.111	0.204
	(0.278)	(0.300)	(0.324)	(0.331)	(0.345)
Δ Village head from the NV × Δ party secretary		0.939	0.935	0.978	0.907
from the NV ($\widehat{\alpha_3}$)		(0.650)	(0.652)	(0.631)	(0.623)
Δ Other member of the villagers' committee			0.135	0.096	0.117
from the NV			(0.218)	(0.222)	(0.218)
Population				0.392	0.391
				(0.304)	(0.315)
Area				-0.282	-0.319
				(0.182)	(0.195)
Herfindahl index of family name composition				-0.067	-0.007
				(0.384)	(0.396)
Herfindahl index of typology composition				0.728	0.662
				(0.925)	(0.912)
Herfindahl index of ethnicity composition				-0.772*	-0.786
				(0.468)	(0.487)
Administrative village center					-0.475
					(0.303)
Had a road passing through in 1999					-0.141
					(0.372)
Percentage of population migrated for work in 1999					-0.012
					(0.009)
Had a natural disaster between 1999 and 2004					0.120
					(0.269)
Administrative village fixed effects	included	included	included	included	included
f-statistics for testing $\widehat{\alpha_1} = \widehat{\alpha_2}$	1.78	0.83	0.78	1.09	1.02
p-value	0.187	0.366	0.379	0.301	0.317
f-statistics for testing $\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\alpha_3}$=0		3.20	3.12	3.02	3.14
p-value		0.078	0.082	0.087	0.081
Number of observations	274	274	274	274	274

Source: PPRP Survey Data (2005).
Note: Robust *t* statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village.

Table 8 presents estimations on changes in the amount of investment. With the full set of control variables, we find that the head home NVs and the party secretary home NVs receive 122 percent and 95 percent more investment, respectively, than the nonleader NVs. The two effects are not statistically different; moreover, a strong interaction effect exists: If an NV is home for both leaders, it receives 207 percent more investment than the home NV of one leader, and over 400 percent more than a nonleader NV.

Table 8. Changes in the monetary value of the public goods received by natural villages and changes in their political power

	(1)	(2)	(3)	(4)	(5)
Δ Village head from the NV ($\widehat{\alpha_1}$)	1.023**	0.838*	0.899**	1.029**	1.224***
	(0.439)	(0.432)	(0.435)	(0.429)	(0.436)
Δ Party secretary from the NV ($\widehat{\alpha_2}$)	0.535	0.669	0.743	0.773	0.945*
	(0.530)	(0.512)	(0.510)	(0.498)	(0.499)
Δ Village head from the NV × Δ party secretary		2.247***	2.239***	2.280***	2.074***
from the NV ($\widehat{\alpha_3}$)		(0.622)	(0.625)	(0.685)	(0.698)
Δ Other member of the villagers' committee			0.258	0.397	0.491
from the NV			(0.449)	(0.411)	(0.409)
Population				-0.093	0.012
				(0.727)	(0.794)
Area				-0.284	-0.396
				(0.402)	(0.397)
Herfindahl index of family name composition				-1.066	-0.858
				(0.804)	(0.824)
Herfindahl index of typology composition				-1.219	-1.220
				(1.868)	(1.799)
Herfindahl index of ethnicity composition				-1.508	-1.599*
				(0.953)	(0.961)
Administrative village center					-1.186*
					(0.668)
Had a road passing through in 1999					-0.045
					(0.601)
Percentage of population migrated for work in 1999					-0.007
					(0.015)
Had a natural disaster between 1999 and 2004					0.173
					(0.558)
Administrative village fixed effects	included	included	included	included	included
f-statistics for testing $\widehat{\alpha_1} = \widehat{\alpha_2}$	0.61	0.08	0.07	0.20	0.25
p-value	0.439	0.775	0.791	0.657	0.616
f-statistics for testing $\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\alpha_3}$=0		14.8	15.41	15.65	15.62
p-value		0.000	0.002	0.000	0.000
Number of observations	274	274	274	274	274

Source: PPRP Survey Data (2005).
Note: Robust *t* statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village.

As a robustness check on the previous results, we use relative indexes of project numbers and values as dependent variables. We assume that the distribution of public resources is egalitarian; that is, the number or the value of public projects received by each natural village is proportional to its population size. The relative index of project numbers is then defined as the ratio of the difference between the actual number of projects a natural village received and the expected number of projects it would receive under egalitarian distribution. The relative index of project values is defined similarly. The

regression results on levels and changes are reported in Table 9. The results are consistent with our previous findings that the home natural village of a village head receives more projects in both number and value. In the first-difference regressions, the coefficients on party secretary are positive but insignificant. We still cannot reject the null hypothesis that the impact of village head and party secretary is the same.

Table 9. Regression results based on relative indexes

	Relative index of project numbers	Relative index of project values
Panel A: Level regressions		
Village head from the NV	0.283***	0.701***
	(0.104)	(0.179)
Party secretary from the NV	0.141	0.350*
	(0.112)	(0.202)
Village head from the NV × party secretary from the NV	-0.133	-0.512
	(0.185)	(0.329)
Number of observations	548	548
Panel B: Regressions of changes		
Δ Village head from the NV	0.426**	0.690**
	(0.167)	(0.328)
Δ Party secretary from the NV	0.053	0.493
	(0.256)	(0.354)
Δ Village head from the NV × Δ party secretary from the NV	0.609	0.465
	(0.434)	(0.506)
Number of observations	274	274

Source: PPRP Survey Data (2005).
Note: Robust t-statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village.

The large magnitude of the impacts found, particularly in Table 8, deserve further investigation, so we turn to the data on project types to see whether any evidence exists that village leaders indeed allocated expensive projects to their home NVs. Results in Table 10 show that the leaders' home NVs receive more running-water projects, but the home NVs of the secretaries receive more programs involving farmland conversion. Moreover, NVs that are home to two leaders receive more roads, farmland conversation programs, and other projects. In the data, the most expensive project is Grain for Green, closely followed by road projects. The evidence that leader NVs are provided with more projects requiring large investments is consistent with the large impacts of political power shown in Table 8.

Table 10. Changes in the types of public goods received by natural villages

	Road	Running water	Grain for Green	Electricity	Program on protecting	Others
Δ Village head from the NV ($\widehat{\alpha_1}$)	0.055	0.118**	0.003	0.086	0.046	0.095
	(0.105)	(0.051)	(0.069)	(0.109)	(0.071)	(0.101)
Δ Party secretary from the NV ($\widehat{\alpha_2}$)	0.140	0.012	0.193**	-0.152	-0.044	0.165
	(0.088)	(0.066)	(0.091)	(0.117)	(0.089)	(0.140)
Δ Village head from the NV × Δ party secretary	0.422	-0.130	0.169	0.152	0.028	0.353
from the NV ($\widehat{\alpha_3}$)	(0.272)	(0.096)	(0.144)	(0.257)	(0.145)	(0.238)
f-statistics for testing $\widehat{\alpha_1} = \widehat{\alpha_2}$	0.61	1.46	2.83	3.39	1.40	0.16
p-value	0.439	0.231	0.098	0.070	0.241	0.689
f-statistics for testing $\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\alpha_3}$=0	5.57	0.00	3.15	0.07	0.01	4.21
p-value	0.021	0.998	0.081	0.799	0.904	0.044
Number of observations	274	274	274	274	274	274

Source: PPRP Survey Data (2005).
Note: Robust t-statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. Other explanatory variables included but not presented are natural village characteristics (including population, area, Herfindahl index of family name composition, Herfindahl index of typology composition, Herfindahl index of ethnicity composition, whether the natural village was at the administrative village center, whether the natural village had a road passing through in 1999, the percentage of population who migrated for work in 1999, and whether the natural village had a natural disaster between 1999 and 2004) and administrative village fixed effects.

Large investments may involve long-term planning, and decisions on the allocation of those projects may be made before the current leaders come into power. If this is the case, then we cannot attribute more resources received by the home NVs of the leaders to the political power of these NVs. To rule out this possibility, we separately estimate the allocation of public goods for each of the three years in one term and find that the impact of political power is evident in each year with slightly larger impact for the first year (Table 11). The results imply that political power is likely to take effect quickly and impact the resource allocation throughout the three-year term.

In most specifications in Tables 5–8, the Herfindahl index variables are insignificant. Although heterogeneity does matter in the outcome of elected village heads, after the home village advantage is controlled for, natural village heterogeneity does not have much impact on the patterns of public resource allocation across NVs.[17]

[17] We also estimate the regressions with the NV political power indicator interacted with the homogeneity indexes. The interaction terms are not significant, which implies that the home village advantage is independent of the NV characteristics in our sample. This conclusion does not support Claim (3) in the conceptual framework.

Table 11. Changes in public goods received by natural villages in each year of a term

	1st year		2nd year		3rd year	
	Number of projects	Monetary value of projects	Number of projects	Monetary value of projects	Number of projects	Monetary value of projects
Δ Village head from the NV ($\widehat{\alpha_1}$)	0.512***	1.052**	0.273	0.980*	0.300*	0.824*
	(0.177)	(0.411)	(0.185)	(0.517)	(0.169)	(0.441)
Δ Party secretary from the NV ($\widehat{\alpha_2}$)	0.409**	1.016**	0.035	0.434	0.136	0.386
	(0.179)	(0.401)	(0.228)	(0.704)	(0.167)	(0.459)
ΔVillage head from the NV × party secretary from the NV ($\widehat{\alpha_3}$)	0.648	2.016	0.330	1.108	0.694**	2.056*
	(0.477)	(1.272)	(0.375)	(0.760)	(0.303)	(1.084)
f-statistics for testing $\widehat{\alpha_1} = \widehat{\alpha_2}$	0.33	0.01	0.99	0.45	0.83	1.08
p-value	0.570	0.940	0.322	0.503	0.367	0.304
f-statistics for testing $\widehat{\alpha_1} + \widehat{\alpha_2} + \widehat{\alpha_3}$=0	6.43	8.05	1.23	3.91	7.34	5.84
p-value	0.014	0.006	0.272	0.052	0.009	0.019
Number of observations	274	274	274	274	274	274

Source: PPRP Survey Data (2005).

Note: Robust t-statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village. Other explanatory variables included but not presented are natural village characteristics (including population, area, Herfindahl index of family name composition, Herfindahl index of typology composition, Herfindahl index of ethnicity composition, whether the natural village is at the administrative village center, whether the natural village had a road passing through in 1999, percentage of population who migrated for work in 1999, and whether the natural village had a natural disaster between 1999 and 2004) and administrative village fixed effects.

Allocation of Public Goods and Subsequent Election or Appointment of Village Leaders

Finally, we examine whether the amount of public goods received by the home NVs of village leaders are associated with the likelihood that the leaders will be re-elected or reappointed. Given that the analysis is carried out at the AV level, we have only 64 observations in the estimations. Despite the small sample, we find evidence that the chance for a village head to be re-elected is significantly and negatively associated with the number of projects his or her home NV has received during his or her previous term (Table 12, columns 1–4). In particular, one more project to his or her home NV reduces the head's probability of re-election by 20 to 48 percentage points. These results are robust to the inclusion of village head characteristics, such as age, education, migration experience, and family clan, as well as characteristics of NVs and AVs. The results based on the amount of investment are presented in columns 5–8 of Table 12. In the model with the full set of controls we find that a 10 percent increase in investment allocated to the home NV is associated with a reduction of 20 percentage points in the chance for re-election.

Table 12. Likelihood of re-election of village head

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of projects received by NV during last term	-0.201*	-0.198*	-0.343*	-0.482**				
	(0.109)	(0.116)	(0.186)	(0.216)				
Investment per capita (log) received by NV during last term					-0.021	-0.011	-0.150	-0.196*
					(0.066)	(0.070)	(0.103)	(0.101)
Age		0.034	0.037	0.117***		0.034	0.036	0.082**
		(0.024)	(0.026)	(0.042)		(0.023)	(0.026)	(0.034)
Education: Senior high school		0.123	-0.422	-0.598		0.182	-0.289	-0.282
		(0.649)	(0.699)	(0.942)		(0.629)	(0.710)	(0.842)
Belonging to the largest family clan in AV		-0.111	-0.100	-0.575		-0.121	-0.083	-0.262
		(0.403)	(0.527)	(0.540)		(0.391)	(0.534)	(0.534)
Belonging to the second largest family clan in AV		0.045	-0.119	-0.470		0.060	0.158	0.179
		(0.495)	(0.567)	(0.673)		(0.504)	(0.561)	(0.566)
Return migrant		0.151	-0.075	-0.725		0.242	0.030	-0.513
		(0.494)	(0.546)	(0.667)		(0.496)	(0.536)	(0.583)
Party secretary from the NV			-0.637	-0.106			-0.655	-0.450
			(0.461)	(0.596)			(0.457)	(0.475)
NV population as share of AV population			0.004	-0.021			0.004	-0.010
			(0.011)	(0.015)			(0.012)	(0.014)
AV center			1.037**	1.992**			1.092**	1.592***
			(0.474)	(0.778)			(0.478)	(0.594)
Herfindahl index of typology composition			0.034**	0.035**			0.034***	0.034**
			(0.014)	(0.015)			(0.013)	(0.013)
Herfindahl index of family name composition			0.019**	0.021**			0.020***	0.019***
			(0.008)	(0.008)			(0.008)	(0.007)

Table 12. Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Herfindahl index of ethnicity composition			0.013*	0.031***			0.012	0.019**
			(0.008)	(0.011)			(0.008)	(0.008)
Natural disaster between 1998 and 2004			0.009	0.233			0.151	0.435
			(0.478)	(0.609)			(0.479)	(0.539)
Number of NVs in AV				0.032				0.015
				(0.072)				(0.065)
Distance between two furthest NVs				0.442***				0.303**
				(0.166)				(0.127)
Total number of projects				0.203***				
				(0.056)				
Total project funding (log)								0.114
								(0.134)
Number of Obs.	64	64	64	64	64	64	64	64

Source: Authors' estimations.
Note: The table reports marginal probabilities from probit estimation. Robust t-statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village; AV stands for administrative village.

We repeat the above analyses for the reappointment of village party secretaries in Table 13. Unlike for the village head, the number of projects allocated to the party secretary's home NV does not compromise his or her chance of reappointment (columns 1–4). The results are consistent across different specifications. When using the value of investment to measure resource allocation (columns 5–8), the finding remains the same—the reappointment probability is not related to the amount of investment received by the home NV.

A cautionary note is needed with regard to the results presented here. As many other empirical analyses of re-election, we do not have a convincing strategy to control for unobservable characteristics of the village leaders, for example their popularity. In addition, we do not have information about other candidates for the village head position; therefore, we cannot claim the correlation between the degree of patronage and the probability of re-election or reappointment to be causal. We want to emphasize, however, that the correlation appears to be very different for the elected in contrast with the appointed cadre. This finding is consistent with that of Rozelle and colleagues (2009), that in elections, villagers reward incumbents who invest more in public goods in their villages, but such dynamic incentives do not exist when village leaders are appointed.

Table 13. Likelihood of reappointment of party secretary

	1	2	3	4	5	6	7	8
Number of projects received by NV during last term	0.063	0.076	-0.013	-0.008				
	(0.122)	(0.124)	(0.142)	(0.151)				
Investment per capita (log) received by NV during last term					0.022	0.025	-0.017	-0.114
					(0.063)	(0.063)	(0.074)	(0.083)
Age		-0.002	-0.001	-0.021		-0.003	-0.000	0.003
		(0.023)	(0.026)	(0.031)		(0.023)	(0.026)	(0.031)
Education: Senior high school		0.319	0.450	0.588		0.319	0.469	0.802
		(0.678)	(0.762)	(0.834)		(0.675)	(0.754)	(0.762)
Belonging to the largest family clan in AV		0.088	-0.011	-0.409		0.114	0.026	0.066
		(0.426)	(0.487)	(0.519)		(0.405)	(0.446)	(0.515)
Belonging to the second largest family clan in AV		0.088	0.028	-0.103		0.039	0.037	-0.024
		(0.402)	(0.449)	(0.569)		(0.481)	(0.544)	(0.554)
Return migrant		0.430	0.352	0.625		0.412	0.347	0.157
		(0.362)	(0.485)	(0.610)		(0.357)	(0.488)	(0.570)
Village head from the NV			1.066**	1.272**			1.077**	1.210**
			(0.486)	(0.583)			(0.481)	(0.587)
NV population as share of AV population			-0.007	-0.016*			-0.008	-0.010
			(0.008)	(0.009)			(0.008)	(0.009)
AV center			1.032*	0.907			1.038*	1.151*
			(0.554)	(0.608)			(0.557)	(0.605)
Herfindahl index of typology composition			0.002	-0.008			0.001	-0.007
			(0.009)	(0.009)			(0.009)	(0.010)
Herfindahl index of family name composition			0.003	-0.000			0.003	0.000
			(0.006)	(0.006)			(0.006)	(0.006)
Herfindahl index of ethnicity composition			-0.019***	-0.026***			-0.019**	-0.025***
			(0.007)	(0.009)			(0.007)	(0.007)
Natural disaster between 1998 and 2004			-0.152	-0.071			-0.156	-0.275
			(0.418)	(0.440)			(0.417)	(0.439)
Number of NVs in AV				0.013				0.026
				(0.071)				(0.075)
Distance between two furthest NVs				0.011				0.075
				(0.111)				(0.114)
Total number of projects				0.184***				
				(0.055)				
Total project funding (log)								0.315**
								(0.150)
Number of Obs.	64	64	64	64	64	64	64	64

Source: Authors' estimations.

Note: The table reports marginal probabilities from probit estimation. Robust t-statistics (corrected for serial correlation within an administrative village and arbitrary heteroskedasticity) in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. NV stands for natural village; AV stands for administrative village.

7. CONCLUSIONS

Based on a primary survey covering two election cycles in Guizhou, one of the poorest and most heterogeneous provinces in China, our paper shows that the accountability structures put in place to select grassroots leaders affect policy outcomes. Group identities influence election results of the village head – elected by popular votes, village heads provide more targeted public goods to their own natural villages. In this regard, despite its authoritarian regime, China's identity politics are not much different from those observed in many other low-income democratic countries.

Suggestive evidence indicates that voters may punish elected leaders who have shown strong favoritism by voting them out of office in subsequent elections, which implies that election has the potential to even out the political advantages across different natural villages. In comparison, party secretaries do not show less favoritism in the allocation of public goods within a village, but our analysis shows that the determinants of appointment and reappointment of party secretaries are primarily unobservable. Further research is needed to uncover the mechanism by which party secretary are (re) appointed.

Scaling up elections in China from the village level to higher levels of government has been discussed in the policy arena. In multiple provinces, experiments involving the election of the party secretary at the township level have already occurred. Our study on the patterns of allocation of public resources under democratic grassroots governance may shed some light on the mechanism and impact of democratization if China decides to extend elections to a higher level.

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